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SULFANILAMIDE IN THE TREATMENT OF BETA HEMOLYTIC STREPTOCOCCAL INFECTION

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During the past year much experimental data and many clinical reports covering most phases of the action of sulfanilamide and its derivatives have appeared in the scientific and medical journals in this country. Up to this time such reports were found only in similar publications in Europe. It is our purpose to present to you a preliminary report of our experience in the treatment of various infectious diseases with sulfanilamide with the hope that it may contribute further to our knowledge on this very important drug.

Three hundred and one patients ill with beta-hemolytic streptococci and with several other kinds of bacteria were treated by us with sulfanilamide and Prontosil during a period of over a year. They were as follows:

	No. of Cases	*Recoveries*	*Deaths*
1. Scarlet fever	114	114	0
2. Cervical adenitis	23	23	0
3. Suppurative otitis media	13	13	0
4. Tonsilitis and pharyngitis	19	19	0
5. Peritonsillar abscess	6	6	0
6. Retropharyngeal abscess	1	1	0
7. Cellulitis	9	8	1
8. Erysipelas	45	41	4
9. Acute meningitis, BHS.	3	3	0
10. Maxillary sinusitis, BHS.	1	1	0
11. Meningococcal meningitis	17	14	3
12. Acute gonococcal urethritis	10	10	0
13. Acute gonococcal epididymitis	6	6	0
14. Acute gonococcal arthritis	4	4	0
15. Acute gonococcal vaginitis (children)	6	6	0
16. Acute gonococcal salpingitis	3	3	0
17. Acute gonococcal conjunctivitis	3	3	0
18. Influenzal bacillus meningitis	3	1	2
19. Pneumococcal meningitis	3	0	3
20. Staphylococcus aureus meningitis and septicemia	1	0	1
21. Tuberculosis meningitis	2	0	2
23. Lymphocytic chorio meningitis	1	1	0
23. Pyelitis B. coli	2	2	0
24. Cystitis B. coli	1	1	0
25. Post abortal infection:			
Staphylococcus aureus	2	2	0
Streptococcus viridans septicemia	1	0	1
Beta-hemolytic streptococcus	1	1	0
26. Lobar pneumonia (untyped) in infant	1	1	0
	301	284	17

At the very out-set we felt that sulfanilamide and its derivatives, being relatively new drugs, required a critical, though fair, clinical trial. Our modus operandi, therefore, consisted of selecting proper cases for treatment, keeping close observation and detail record of each case, and making certain that the dosage of the drug was adequate. In the selection of the cases it was important that the bacteriological etiology be known before treatment was given. At first we confined treatment with the drugs to patients with beta-hemolytic streptococcal infections; later we included meningococcal meningitis, gonococcal infections, and several other forms of bacterial infection.

We consider the dosages very important and in this we were aided by the suggestions of Long and Bliss.[17] These investigators found that 1-10,000 was the most effective dilution of sulfanilamide to cause bacteriostasis in vitro. On this basis, they calculated what they believed adequate and safe dosages for man. Shortly afterwards, however, Marshall and his associates,[18] developed a method by which an accurate quantitative determination of sulfanilamide in the blood and other body fluids could be made. They found that the maximum concentration of the drug in the blood when taken per os was reached in about four hours, and this was about the same rate of absorption as when it was given by hypodermoclysis. Using this means of determining the blood sulfanilamide levels as a check, proper dosages and a definite plan of treatment were formulated. In severe infections such as beta-hemolytic streptococcal meningitis, or meningococcal meningitis, a large initial dose of the drug is given either by mouth or by hypodermoclysis with the aim of attaining a blood level of 10mg per 100cc of blood

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From the Charles V. Chapin Hospital.

The second of four papers in a symposium on Sulfanilamide, presented before the Providence Medical Association, at the meeting on April 4, 1938. The first paper has been printed in the September number.

within four hours. When this is accomplished a maintenance dose is given every four hours until the patient is considered improved enough for a reduction in the dosage. It is advisable to check on the blood level of the drug at the end of the first four hours. If the level is below the desired 8 to 10mg. then sulfanilamide should be given parenterally. Another check is advised at the end of the first 24 hours in order to determine the adequacy of the maintenance dose.

We have condensed in a table the dosages of sulfanilamide and 2.5% Prontosil solution as suggested by Long and Bliss.[19]

IN SEVERE INFECTIONS

Sulfanilamide Tablets for Administration by Mouth

	Initial Dose	*Maintenance Dose*	*Intervals*
Adults, 100 lbs. and over	50-90 grs.	15 grs.	4 hours
Adults, 50-90 lbs.	30-50 grs.	10-15 grs.	4 hours
Children, 25-50 lbs.	20-30 grs.	5-10 grs.	4 hours

0.8% or 1% Sulfanilamide in Normal Saline for Parenteral Administration

	Initial Dose	*Maintenance Dose*	*24 Hours*
Adults, 100 lbs. and over	700cc	500cc	8 hours
Adults, 50-90 lbs.	300-500cc	200-300cc	8 hours
Children, 25-50 lbs.	100-300cc	100-200cc	8 hours
Babies	One gram per 10 lbs. during first 24 hours		

Intrathecal Administration

5 to 10cc less than amount of cerebrospinal fluid removed

2.5% Prontosil Solution for Subcutaneous Administration

Adults, 100 lbs. and over	20cc at 4 hr. intervals for 24 hrs.
Adults, 50-90 lbs.	10-15cc at 4 hr. intervals for 24 hrs.
Children, 10-50 lbs.	5-10cc at 4 hr. intervals

Prontosil is definitely irritating when given intrathecally. Severe reactions may occur if given intravenously.

MODERATELY SEVERE INFECTIONS

Tablets by Mouth:—
Adults, 10-15 grs. at 4 hour intervals
Children, 5-10 grs at 4 hour intervals

VERY MILD INFECTIONS

Tablets by Mouth:—
5-15 grs. 4 times daily

After the patient has shown definite clinical improvement the drug should be rapidly reduced to one-half, then finally to one-third or one-fourth of the original maintenance doses. The drug is then continued until convalescence is well established. In some instances it is advisable even to continue the drug for two weeks longer. In the main, we have adhered to these dosages fairly closely, but as we gained more experience we altered them according to our own needs.

The Prontosil solution, 2.5%, was the only one of these drugs available to us at the beginning of our undertaking. After having used it for a short time we received objections from the patients. The chief objection was the pain from the injections rather than from any local or general reaction of the drug. Some patients refused altogether to take further injections. We were, therefore, glad to receive Prontylin tablets for oral administration. In a short time we noted that Prontylin by mouth was just as efficient if not superior to Prontosil in its therapeutic effect, and certainly it was more pleasant to the patients and simpler to administer. Since then we have used nothing but Prontylin tablets by mouth, and the 0.8% or 1% Prontylin solution for parenteral use.

As our report is in the form of a symposium and as the time alloted is limited, many details and some interesting observations must of necessity be omitted in this discussion.

Two hundred and thirty-three of our total number of 301 cases were caused by beta-hemolytic streptococci. Twenty-three of these were cervical adenitis, both of scarlet fever and non-scarlet fever origin. There were fifteen of the former and eight of the latter. All these cases were selected either because they were severe or that they had resisted the usual local treatment. Some of the cases showed rapid dissolution of the enlarged glands when sulfanilamide was given, while in others the process was slow and in some instances rather disappointing. There seemed to be no obvious difference in the response to the drug of either the scarlet fever or the non-scarlet fever cervical adenitis. On the whole, our impression is favorable to the use of sulfanilamide in such infections.

The same conclusion can also be made on the thirteen cases of beta-hemolytic streptococcal suppurative otitis media. Some made remarkable recoveries, while in others improvement was discouragingly slow. It was noted that the more recent of the cervical gland or middle ear infections responded far more readily to the chemotherapeutic treatment than infections of longer standing. A total of nineteen cases of tonsillitis and pharyngitis, six of peritonsillar abscess, and one of retropharyngeal abscess were treated with sulfanilamide without a single fatality. The same was true of twenty-five other cases of tonsillitis and pharyngitis and seven of peritonsillar abscess which did not receive sulfanilamide. The morbidity was identical in each group and statistically the effect of the drug might apparently be considered indifferent were it not for the fact that the patients who were given the chemotherapeutic agent had severer infections. Our clin-

ical experience indicates that sulfanilamide is of definite value in severe throat infections of beta-hemolytic streptococcal origin.

One patient with a severe maxillary sinusitis responded readily to treatment with Prontosil. There were nine cases of cellulitis with one death. Two developed abscesses which were incised and drained. The one death was a white woman, 57 years old, who was in a stuporous condition on admission with a temperature of 104.2 F. She had cellulitis of the leg from a varicose ulcer, and a hemiplegia for four years following a "shock." The remaining eight patients responded well to treatment with the drug.

One hundred and fourteen cases of scarlet fever were treated with sulfanilamide. One hundred of these were treated routinely, with another one hundred as controls. This particular study was undertaken to determine the prophylactic value of sulfanilamide toward the usual complications of scarlet fever, and also to determine its value in ridding the nose and throat of beta-hemolytic streptococci, and thus eliminate carriers. This work is incomplete at the present time and will be the subject of another paper.

Fourteen cases of toxic scarlet fever were encountered. Three were treated with Prontosil, four with Prontylin, one with Prontosil and antitoxin, five with Prontylin and antitoxin, and one with Prontosil, antitoxin, and Prontylin. Scarlet fever antitoxin was given in each instance because the chemotherapeutic agents failed to relieve the patients of the toxic symptoms as promptly as was desirable in such cases. It has been our experience that in toxic scarlet fever the outcome might be very serious unless something was done to relieve the toxemia immediately. We have found the commercial scarlet fever antitoxin highly effective in this respect. Rather than take the risk of a fatal outcome for the patient, and incidentally an adverse record for the drugs, antitoxin was given without further ado. An analysis showed that in the first cases treated, the amount of the drug received in the first twenty-four hours was far below what was later considered adequate for such severely sick patients; which might have accounted for the poor results. Our next procedure then was to administer larger doses of sulfanilamide. Four casese treated in this manner were benefited, but only after several days of anxious waiting. The cyanosis, drowsiness, and general malaise which invariably developed when large doses of sulfanilamide were given made it extremely difficult to determine the true condition of the patient. The temperature chart in these few cases did not help the anxiety of the attending physicians, because it dropped by slow lysis. From what is known of the therapeutic action of sulfanilamide one can hardly expect it to neutralize the toxin already present in all the tissues of the body, although we are aware of the conclusion to the contrary of Osgood.[9] It would seem to us that the logical procedure to follow is the simultaneous administration of scarlet fever antitoxin and sulfanilamide in toxic cases. This we tried in two patients with excellent results.

In this series of beta-hemolytic streptococcal infection, there were forty-five cases of erysipelas with four deaths, a mortality rate of 8.9%. Thirty-two were erysipelas of the face, one of the arm, one of the trunk and arm, one of the scalp and neck, and ten were of the leg. Two of the total number of patients were under one year old, one was one month, and the other two and a half months. Eighteen were fifty years and over. It is to be recalled that erysipelas is a self-limiting disease, and that the mortality rate is high at the two extreme ends of life. It is highest in patients under one year old, the mortality rate being between 40% and 70%,[20] and in elderly patients 20% to 40%. The mortality rate for all ages is about 10%.[21]

On the whole, the result of treatment of this type of beta-hemolytic streptococcal infection with the chemotherapuetic drugs was highly effective. With few exceptions, the temperature dropped by crisis within twenty-four to forty-eight hours and a normal level was reached and maintained in the average of three to four days. The patient generally felt better and the erysipelatous lesion became less edematous and less red within twenty-four to forty-eight hours after the institution of the treatment. There were four extensions of the local lesion and one relapse. Three patients developed abscesses. All of the four deaths occurred in patients ranging in age from 53 to 79 years. In two of the patients the erysipelatous lesion continued to spread under treatment with Prontosil. They died within a week of admission to the hospital. One of them had diabetes mellitus. The third patient was also a diabetic and was in coma on admission. He died in sixteen hours. The fourth death was the direct result of coronary disease. This patient was considered cured of erysipelas and was ready to be discharged when the accident occurred.

Three patients with acute beta-hemolytic streptococcal meningitis of otitic origin were successfully treated with sulfanilamide. These cases perhaps deserve a little more detail consideration than the others. The first of these was a white girl, seven years of age, admitted to the hospital June 19, 1937, in a critical condition. She had had an acute otitis media of the right ear for one week and a paracentesis was done four days before admission. The patient first complained of headache and stiffness of the neck two days prior to hospitalization. On admission patient was moderately cyanotic and irrational. There was profuse purulent discharge from the right ear, but without tenderness or edema over the mastoid region. All the cardinal signs of meningeal irritation were present. Lumbar puncture revealed turbid spinal fluid with 1300 leucocytes mostly polymorphonuclear cells; Pandy +, and sugar 34mg. Thirty-five cubic centimeters of the 0.8% solution of sulfanilamide in normal saline was given intraspinally. Prontylin tablets were given by mouth. The intrathecal treatment was given once daily for nine days. X-ray pictures showed haziness in the right mastoid without cell destruction. Mastoidectomy was not performed. Cultures from the aural discharge showed staphylococcus aureus and beta-hemolytic streptococci. The first spinal fluid culture was positive for beta-hemolytic streptococci. All subsequent cultures were negative. The blood culture was negative. Convalescence was uneventful. Prontylin was continued by mouth in small doses until patient was discharged on her 36th day in the hospital.

The second patient was a white girl, sixteen years of age, who was admitted to the hospital January 3, 1938. She had contracted a sore throat the week before Christmas. A few days later she complained of an earache on the right side. She was admitted to one of the local hospitals and was doing well until two days before she was transferred to this hospital when she complained of a headache and stiffness in her neck. The patient was conscious and did not appear extremely sick on admission. Temperature was 100 F. There was purulent discharge from the right ear. Except for a slight tenderness, the right mastoid was negative on examination. All the cardinal signs of meningitis were present. The spinal fluid was cloudy and contained 5000 leucocytes mostly polymorphonuclear cells; Pandy +, sugar 50mg. Forty cubic centimeters of 1% Prontylin was injected intrathecally. Prontylin tablets were given by mouth. The first two spinal fluid cultures were positive for beta-hemolytic streptococci. Subsequent cultures were consistently negative. A culture from the aural discharge showed beta-hemolytic streptococci. The blood culture was negative. The right mastoid showed cloudiness by x-ray pictures without cell destruction. Mastoidectomy was not done. Intrathecal treatment with Prontylin was given once daily for five days. Convalescence was uneventful. Prontylin was continued by mouth until patient was discharged on her forty-second day in the hospital.

The third and last patient with beta-hemolytic streptococcal meningitis was a seven year old white boy who was in extremes when admitted on January 9, 1938. He had had a sore throat and a right acute supperative otitis media for about seventeen days. One week before admission he experienced severe headaches and fever. Three days prior to hospitalization began to vomit and continued up to the time of admission. Patient was semi-comatose and restless when examined. He was thin and markedly dehydrated. Temperature was 105.6 F. (rectal). There was a moderate amount of purulent discharge from the right ear, and a slight mastoid tenderness but without edema. The neck was rigid, but the Kernig and Brudzinski signs were negative. Lumbar puncture was performed and 45cc of 1% Prontylin solution were injected. There were 1200 leucocytes in the spinal fluid with polymorphonuclear cells predominating. Three hundred cubic centimeters of the 1% Prontylin was given intravenously on admission. The same amount was given twice the following day, and once on the third day. At this time the patient had improved enough to be able to take the Prontylin tablets by mouth. X-ray films of the right mastoid were negative. Mastoidectomy was not done. Lumbar puncture was done and Prontylin injected once daily for twelve days. The spinal fluid cultures of the first two punctures were positive for beta-hemolytic streptococci. Subsequent cultures were negative. The Pandy test was positive and sugar was 12mg on the first spinal fluid. The culture of the aural discharge showed staphylococcus aureus and beta-hemolytic streptococci. The blood culture was negative. The patient ran a spike temperature chart for sixteen days before leveling out. Prontylin tablets were continued by mouth until the patient was discharged, forty days after admission.

A total of thirty-seven cases of beta-hemolytic streptococcal meningitis, not incuding the three cases in this report, have been treated at the Charles V. Chapin Hospital since its founding twenty-eight years ago. All but one of the thirty-seven died, making a mortality rate of 97.3%. Schwentker and his colleagues,[22] reported three recoveries out of four cases treated with sulfanilamide. They found from the records of the Johns Hopkins Hospital thirty-seven cases with 100% fatality. Holman and Duff,[23] in their extensive review of the literature on this subject found 89 recoveries from 1901 to 1937 in which sulfanilamide and its derivatives were not used. In the relatively short period of less than two years, they found records of forty-three recoveries following the use of these drugs.

If there had been any doubt in our minds as to the efficacy of sulfanilamide in the treatment of beta-hemolytic streptococcal infections, that doubt has been dispelled by the complete recovery of the three cases of beta-hemolytic streptococcal meningitis which we have successfully treated with this drug during the past few months.

SULFANILAMIDE IN THE TREATMENT OF OTHER BACTERIAL INFECTIONS

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This paper will be devoted to the resuts of sulfanilamide therapy in a group of miscellaneous infections. The group includes:

1. Gonococcal Infections
2. Pneumococcal Infections
3. Influenzal meningitis
4. Staphylococcal Infections
5. Escherichia coli
6. Streptococcus viridans Septicemia
7. Staphylococcus aureus meningitis
8. Tuberculous meningitis
9. Whooping Cough
10. Pneumonia
11. Lymphocytic chorio meningitis
12. Meningococcal meningitis

From the Charles V. Chapin Hospital.
The third paper in a symposium on Sulfanilamide, presented before the Providence Medical Association, at the meeting on April 4, 1938.

There were thirty-three cases with some form of gonorrheal infection in which sulfanilamide was used. Twenty of these cases were male adults who were admitted in most instances because of some complication such as epididymitis or arthritis. At the time we were interested in seeing the effect of the drug upon the urethral discharge and the rapidity with which the smears would become negative so, except in the arthritic cases, not much emphasis was placed on the effect of the drug on other complications. In this series there were also four cases with arthritis, six with vaginitis, three with salpingitis and three with conjunctivitis. In the male adult group, fifteen on admission had positive smears and a urethral discharge, three had no discharge and two had no smears taken. After administering the drug, the discharge stopped in eight of the cases; the earliest of which was two days and the latest fourteen days. Two had recurrence of their discharge. Nine developed permanently negative smears in from two to five days which remained negative. Six had persistently positive smears. One patient, after receving 1455 grains, was then given protargol injections in addition to sulfanilamide. This resulted in some improvement in his condition. This patient had an epididymitis which was still evident after nineteen days treatment with the drug. One month after discharge patient still had positive smears.

The results obtained in the arthritic cases were more satisfying. Four cases were admitted with gonorrheal arthritis all of which received sulfanilamide. One patient developed a reaction in a few days so that the drug was stopped before any beneficial results could be noted. Two cases did very well and the fourth case was benefited but not as quickly.

One of the patients who did well might be mentioned in more detail. A woman was admitted with acute arthritis of left elbow and tenosynovitis of right wrist. Slightest movement of either upper extremity caused excruciating pain. For five days she was treated with infra-red lamp and foreign protein without results. Sulfanilamide was started on the sixth day. The inflammation rapidly subsided. On the fourth day of this treatment, temperature was normal, swelling and tenderness were gone and there was a complete return of function.

Six cases of gonococcal vaginitis in children, four of which had positive smears, were treated with sulfanilamide. Two of these had previously received

theelin subcutaneously in large dosages without any appreciable effect on the discharge, although the smears became negative. After sulfanilamide therapy the discharge ceased in three cases in from five to thirteen days. The smears became negative in two cases in from five to twelve days. The discharge persisted in three cases; two of which had persistently positive smears in spite of large dosages—1280-1420 grains in forty-seven days. Endoscopic examination showed the cervix to be involved in all three cases.

Three cases of gonococcal conjunctivitis in children were treated with sufanilamide by mouth and subcutaneously along with the usual routine treatment of irrigation. Two had positive smears and the third had negative smears on admission although clinically it was a gonococcal conjunctivitis. Two did very well with this combined therapy and were discharged in five and nine days. The other case showed no improvement, and developed corneal ulceration. Of the two that did well, one remarkable cure resulted. A fourteen months old boy was admitted with an acute gonococcal conjunctivitis. The smear from the conjunctiva was positive for gonococci. On admission he received 300 c.c. of the 1% solution subcutaneously. In twenty-four hours the inflammation had practically ceased; smears were negative and the discharge was very scanty. The drug was given by mouth until he was allowed to go home on the sixth day. The total dosage by mouth was 180 grains.

Three cases of gonococcal salpingitis were treated with sulfanilamide. One began to vomit on the second day and continued until the sixth day at which time the drug was discontinued. There was no change in the temperature or in the sedimentation rate during the period of drug therapy. In the second case the drug was discontinued for the same reason. No improvement was noted clinically or in the sedimentation rate. The third case on admission had a tender pelvic mass and elevated temperature. In three days the mass was definitely smaller and the tenderness had disappeared. The temperature was normal on the seventh day but the sedimentation rate was still rapid. The patient was discharged on the fifteenth day with some pelvic thickening but no tenderness and a normal sedimentation rate.

One interesting complication occurred in one of our male patients who was admitted with urethritis and epididymitis. Admission routine nose and throat cultures on two successive days were negative. On the twentieth day, after having received 1240 grains of sulfanilamide, he developed an acute tonsillitis. At that time he was receiving forty grains a day. Throat cultures showed that he had a four plus hemolytic streptococcus. This brings up an interesting question as to the value of the drug in prophylaxis. Long and Bliss[19] state that sulfanilamide may be used as a prophylactic agent against hemolytic streptococcal infections in times of epidemic outbreak and suggest appropriate dosages. Kenny, quoted by Holman and Duff,[23] mentioned two cases that developed tonsillitis while under treatment for bacilluria with sulfanilamide.

Three cases of Type VII Pneumococcal Meningitis with Septicemia have been treated with this preparation in the routine way. Two died very promptly, one in twelve hours and the other in forty-eight hours. The third case lived a few days over two months. On admission this patient received Prontosil intramuscularly for four days, a total dosage of 400 c.c., with no apparent effect. Sulfanilamide was then given daily intraspinally and by mouth. After twelve days of this treatment, as the spinal fluid was still positive, specific antiserum was combined with the intraspinal sulfanilamide. Two days later the spinal fluid cultures were negative. Subsequent cultures were negative. In spite of this apparent improvement in the spinal fluid the patient was clinically failing and began to show signs of a septicemia. This was proved by finding the organism in blood cultures whereas previous blood cultures had been negative. As a last resort two transfusions were given but the patient died shortly after the last one. Autopsy showed adhesions of the meninges with pocketing of the exudate, which may explain the negative spinal fluid findings. There were scattered petechial hemorrhages in the meninges, peritoneum, endocardium and pleura. Thick vegetations completely occluded the mitral valve. The lung showed a right upper lobe pneumonia. This patient received 5,065 grains of the drug by mouth in two months.

Three cases of influenzal meningitis were treated with sulfanilamide in the routine manner. As two of these cases showed no response to this therapy, antiserum was given as well but the cases terminated in death. The spinal fluid cultures were persistently positive for hemolytic influenzae, the cell counts high and the sugar low. The third patient recovered after a long stay in the hospital. This patient, as soon as the casual agent was determined, received specific antiserum daily intraspinally. Clinically he seemed to improve but the organisms per-

sisted in the spinal fluid. No treatment of any kind was given for one month, with no change in the occasional spinal fluid cultures that were taken. Clinically, however, he continued to improve, so sulfanilamide was started by mouth. For twenty days under this therapy the spinal fluid cultures were still positive. On the twenty-first day, intraspinal sulfanilamide was started. Spinal fluid cultures taken at this time were later reported negative. Daily intraspinal treatment was followed by prompt improvement in the spinal fluid cell count and sugar. All subsequent spinal fluid cultures were negative and the patient was discharged as cured. It was felt, however, that the causal agent was one of low virulence, otherwise the patient would not have lived through the period when no treatment was given. The effectiveness of the drug in this case is problematical.

In the post-abortal group there were two cases in which staphylococcus aureus was the causal agent. Both were running high temperatures and had a foul lochia. The temperatures became normal on the seventh and ninth days. The foul odor disappeared in one week's time but the lochia did not cease until the eleventh day. A third case in this group had hemolytic streptococcus as the causal agent. This patient was not very ill, the temperature never being over 100.4 F. The lochia ceased on the fourteenth day.

Two infants with Pyelitis due to Escherichia coli were treated with sulfanilamide. In both cases the urine showed albumen and clumping of white blood cells. One was running a high temperature but in twenty-four hours after drug therapy was instituted it dropped to normal and remained there. The other patient had a normal temperature when the drug was started. Both showed a clearing of the urine with less clumping and a change from acid to alkaline reaction. One was discharged in four days and the other in twenty-four days. The latter had Escherichia coli in the urine eight days after sulfanilamide was started.

One patient was admitted for an infection following a self induced abortion. Admission blood cultures showed a streptococcus viridans to be present. Physical examination was essentially negative, so it was felt that the focus of infection was in the uterus; however, cultures of the lochia showed an Escherichia coli. She was on sulfanilamide therapy before admission. This was continued with no improvement and the patient died in two days.

One case of staphylococcus aureus meningitis with septicemia was treated with the drug without any effect, for the patient died in less than forty-eight hours. Two cases of tuberculous meningitis were treated with the drug with no improvement. Two cases of whooping cough were treated without any shortening in the length of the paroxysmal stage or in the duration of the disease. One very sick infant with an untyped pneumonia, who on admission had to be put into an oxygen tent, was given the drug. In three days he was out of the oxygen. The temperature returned to normal in seven days.

A case later diagnosed as lymphocytic chorio meningitis is included in this group. The diagnosis was made on the negative spinal fluid cultures and predominance of lymphocytes in the spinal fluid. Admission temperature of 104 F. fell to normal in twenty-four hours. The effectiveness of the drug in this case is questionable because of the rapid recovery without treatment in this type of infection.

Since February 17, 1935, the number of meningococcal meningitis cases admitted to the hospital has been unusually large. From this date until May 14, 1937, a period of approximately two years, seventy-five cases were admitted. These were all treated with antisera or antitoxin with a mortality rate of 42.6%. The group consisted of all types of the disease from mild to severe.

In view of the large number of cases of this infection that were being admitted and since favorable reports had appeared in the literature on the effectiveness of sulfanilamide in this disease, it was decided the drug should be used in all new cases. Our routine was not to be changed in any way except to substitute sulfanilamide forantisera or antitoxin. The dosage used intravenously, subcutaneously, intraspinally or by mouth, has been given in the preceding paper. It probably should be added that intraspinal treatment was given daily, instead of every twelve hours as advised by Schwentker and Long.[24] The criteria as to when to stop intraspinal treatement were based upon normal spinal fluid sugar, lowering of spinal fluid cell count or change in character of the cells, negative spinal fluid cultures and clinical improvement.

Routine blood and spinal fluid cultures in ascitic fluid broth were taken on admission except in two cases. Subsequent spinal fluid cultures were limited to incubating the spinal fluid, because the bacteriologist felt that it was a good culture medium.

Since starting this series, seventeen cases have been admitted to the hospital, most of which were

of the mild type. The ages ranged from five months to fifty-six years, the majority being ten years or under. Ten were males; seven females. On admission ten patients had signs of septicemia. The evidence was petechial or ecchymotic spots present in the skin and in the conjunctivae. Only one positive blood culture was obtained although all flasks were incubated for eight days before being called sterile.

Three cases in the series died within a few hours after admission; one before any treatment could be given, another in one and a half hours, and the third in six hours. The mortality rate was 17.6%. In comparing this rate with that of the other series one sees that there has been a marked reduction over those treated with specific antisera, although in neither series has the mortality rate been corrected. The fact that sulfanilamide solution is not irritating to the meninges aids materially, in that now the cell count is of some value in following the progress of the disease, whereas with the antisera, because of their irritating action, the cell count was apt to mislead one into giving further treatment.

It is interesting to note that with one exception, after the first intraspinal sulfanilamide, all subsequent spinal fluid cultures, on being incubated overnight, were negative for meningococcus. A case which illustrates this point very well is that of a fifty-six year old female, who was the first case to receive sulfanilamide for the treatment of meningococcal meningitis. Previous to this therapy she had received daily intraspinal antiserum with no apparent effect, as the organisms were easily found in the spinal fluid sediment. She had also received on admission 120 c.c. of the antiserum intravenously. On her seventh day she received her first sulfanilamide intraspinally and by mouth. The next day's spinal fluid was negative for meningococcus and remained negative thereafter. This agrees with the results obtained by Schwentker[24] et al and more recently with L. J. Willien.[25] Thinking that possibly the presence of sulfanilamide in the spinal fluid might be exerting a bacteriostatic action during this incubation period, several spinal fluids were contrifuged and ascitic broth poured upon the sediment. These cultures after being incubated for seventy-two hours remained sterile.

No complications occurred and there were no relapses. One patient was a carrier whose condition was not influenced by the drug. He finally had negative nasopharyngeal cultures after tonsillectomy and adenoidectomy were done.

The average number of intraspinal treatments given was five; however, it was thought that more were given than necessary. No cases have been treated by subcutaneous and oral therapy alone as Willien[25] recently did in three of his cases.

It was felt in the very toxic cases, since sulfanilamide does not relieve toxicity as quickly as antitoxin, as was our experience in scarlet fever, it would be better to use on admission both antitoxin and sulfanilamide intravenously and sulfanilamide intraspinally. Branham and Rosenthal[26] found that serum and drug operate through different mechanisms and that the best results in the therapy of meningococcal meningitis would be obtained by employing both forms of treatment. They felt that a synergistic action existed between the two. Possibly, by this combined form of treatment, the mortality rate may be lowered still further. However, no form of therapy will save the fulminating cases, in which death usually occurs in a few hours from circulatory collapse.

Because of these good results, all new cases of meningitis on admission are put on sulfanilamide therapy until the causal agent has been identified.

Comments: From the results obtained in this small series of cases of gonococcal infection with urethral discharge, we can not help feeling that the drug has not lived up to expectations. The results do not agree very well with those reported in the literature. The results in the treatment of arthritis are encouraging. The drug seems to have a definite place in this type of complication. Those cases of vaginitis which had no involvement of the cervix did well but in our experience did not improve more rapidly than with other types of treatment. While one remarkable result in conjunctivitis impresses one favorably our series is too small to draw any definite conclusions. More such infections should be treated with this preparation. The drug has a definite place in the treatment of meningococcal meningitis as is shown by the rapid disappearance of the organisms from the spinal fluid, the quick recovery of the patients and the definite lowering of the mortality rate. The possibility of serum reactions or irritative meningitis is eliminated when this preparation is used. However, when toxicity is marked, the best treatment probably is the early combination of the antitoxin and sulfanilamide. No conclusions can be drawn at the present time for the remaining infections, because they are too few in number.

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THE NASAL AIRWAYS

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This paper on the general subject of dental deformity is given from the standpoint of the rhinologist. "Shut Your Mouth" I felt, was an impolite title; although I have a book written in 1869 by George Catline, whose title *Breath of Life* is quite obscured by the large white lettered subtitle *Shut Your Mouth*. The author devoted the greater part of his life to visiting and studying some 150 different native races in North and South America. In this little book he makes an ardent plea for training children to breathe through their noses. Illustrated by striking line drawings, the author contrasts the civilized Englishman of that period with the uncivilized Indian. I quote—

"Civilized man may properly be said to be an *open mouthed* animal; a wild man is not. An Indian warrior sleeps and hunts with his mouth shut; and with seeming reluctance, opens it even to eat or to speak. An Indian child is not allowed to sleep with its mouth open from the first sleep of its existence; the consequence of which is, that while the teeth are forming and making their first appearance they *meet* (and constantly *feel*) each other; and taking their relative natural positions, form that healthful and pleasing regularity which has secured to the American Indians, as a Race, perhaps the most manly and beautiful mouths in the world." Further, in regard to those children who have become habitual mouth breathers "the nasal ducts, being vacated, like vacated roads that grow up to grass and weeds, become the seat of polypus and other diseases." And he later states, "in all these instances there is a derangement and deformity of the teeth and disfigurement of the mouth, and the *whole face*, which are not natural, carrying the proof of a long practice of the baneful habit, with its lasting consequences; and producing that unfortunate and pitiable, and oftentimes disgusting expression which none but civilized communities can present."

With these quotations as my text, I shall first briefly review the anatomy and development of the nasal cavities and the nasopharynx. The nasal cavities and the nasopharynx will be considered together as making up the nasal airways. Secondly, I shall enumerate the physiologic functions of these areas, and lastly, emphasize the importance to the individual of the loss of normal physiologic function of one or both nasal air passages.

The nasal airways begin in front with two more or less attractive openings and extend backward for some two inches. Here openings twice as large as the anterior ones facilitate the entrance of air into the nasopharynx. In the nasopharynx the inspired air turns a corner and leaves the nasal airways to pass downward behind the soft palate, behind the base of the tongue, crossing the alimentary tract, to enter the larynx, and then the trachea, bronchi, and lungs.

The anterior openings to the airways are nearly horizontal in position, while the posterior openings are nearly vertical. We have lost control over our anterior nares and most of us can move them but slightly. Certain of the lower mammals, seals for example, can shut their exterior nares completely. We can expand and contract ours a little and with some effort. Through the open horizontal anterior nares then, air currents enter our nose perforce in an upward direction. The hairs just inside the entrance act as strainers for the inspired air.

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Read before the Rhode Island Medical Society, at the one hundred and twenty-seventh Annual Meeting, Providence, June 1-2, 1938.

The normal nasal cavities are very narrow, slit-like passageways. The floor of each nasal chamber is formed by the hard palate. The average floor is two inches long but less than three-eighths of an inch wide. The height of the nasal cavity equals its length, the vertical measurement being at least two inches. But the width of either nasal chamber at the upper part averages between one-sixteenth and one-eighth of an inch. Furthermore each nasal chamber is narrowed by the turbinates on its lateral walls. There are three or four turbinates on each side. These run almost the entire length of the nasal cavity and bulging mesially, they nearly touch the septum. Indeed, they fill up 80 to 90% of each nasal cavity.

The septum separates the two nasal cavities from each other. Only rarely do we have a straight thin septum. From the time of our birth the nose receives much more trauma than is commonly realized and resulting septal irregularities are the rule. For the most part these deviations are slight. Any septal deviation or bending to one side is usually compensated for by a deviation to the opposite side. In a narrow nose even slight deviations cause partial nasal obstruction on each side. In any nose, however wide its architecture, severe septal deviations interefere with the airways on one or both sides.

The septum, the floor, the turbinates, the spaces between, and the sinuses leading from these meatuses, all are lined with a ciliated mucous membrane. Over the mid portion of the septum, and especially over the middle turbinates, this mucous membrane lining is very thick. It rests on a sub-mucosa richly supplied with blood vessels containing blood lakes. Like other erectile tissues, engorgement here is a normal physiological process. While there is sufficient room for a normal degree of engorgement, pathological or excessive engorgement obstructs the airway.

Posteriorly the adult choanae are one inch high and one-half inch wide. They are completely surrounded by bone and hence maintain at all times free communication of the nasopharynx with the outer world via the nasal passageways. This fact is one of the utmost importance to our ears. The Eustachian tubes connect each middle ear with the nasopharynx. It is by this tube that the air pressure in the middle ear is kept equal to the external air pressure. Also, of course the Eustachian tubes drain and ventilate the middle ears. From the roof and back wall of the nasopharynx, between the openings of the Eustachian tubes, there hangs a mass of lymphoid tissue known as the adenoid or pharyngeal tonsil. The average size of the nasopharynx in the adult is one inch high, one inch wide, and one inch deep. In the adult then, it takes a rather large mass of tissue to fill this cavity and thereby block off the airway. While the anterior entrances to the nasopharynx, the two posterior choanae are always open, the lower opening to the nasopharynx is sometimes open and sometimes closed. The soft palate acts as a door and closes the nasopharynx and nasal airways each time we swallow. Of course this soft palate door is below the level of the Eustachian tube orifices and, as the act of swallowing opens these tubes, air pressure equalization is efficient.

At birth the nasal airways and their associated structures are extremely small. During the first two decades of life, growth takes place and is particularly related to the growth of the teeth. Growth never occurs at a uniform pace. During some years it is almost violent in its rapidity but after puberty, growth slows down and after the age of twenty-five we do not notice any increase in the size of the sinuses. The external nose at birth is about one-third its adult size. The nasal chambers more than double their height and width. The septum and turbinates, likewise, have to more than double their birth size. Between the turbinates small outpouchings, formed in the third and fourth months of foetal life, continue to expand for the next twenty to twenty-five years, developing into the accessory nasal sinuses. This growth does not occur steadily but periodically, by leaps and bounds. With the descent of the second teeth, which in early childhood fill up a large part of the superior maxilla, there comes a marked increase in the vertical height of the face and of the nose. Slight variations from the normal produce marked changes as development goes on. For example, if one of the upper central permanent incisor teeth does not descend along with its mate we have a bump persisting on one side of the anterior floor of the nose. This area is in contact with the lower anterior part of the nasal septum. Curiously enough, this part of the septum is prone to act as a rudder and controls the course of the growth of the remainder of the septum. If this rudder be thrown even slightly to one side or the other, the result is liable to be a subsequent deviation of the septum.

In a similar fashion proper descent of the second teeth have a far reaching effect on the development of the maxillary sinuses and thereby on the symmetry of facial development. The face is not only built for the teeth, it is built by them.

The nasopharynx, like the nose, undergoes tremendous increase in size during the first two decades of life. At birth the nasopharynx is a horizontal space one-eighth inch high, one-fourth inch wide, and one-fourth to one-half inch long. It grows in an upright fashion to become a large chamber. Its adult size is too often unappreciated. In the first two or three years of life, when the nasopharynx is still very small, a slight amount of enlargement of the adenoidal tissue easily blocks the nasopharynx. A head cold, for example, will cause sufficient swelling and engorgement of the adenoid to block the nasopharynx completely. With repeated colds, resulting hypertrophy causes chronic obstruction. Normal nasal respiration is prevented.

Now I shall speak of the importance of the patency of the airways. The nose does much for us. It acts as an air warmer, humidifier, dust catcher, germ trapper, voice resonator, a sinus drainer, and an air pressure equalizer. But all these roles and others I have not mentioned are of secondary importance. The primary function of the nose is of course olfaction. We are not concerned today with the sense of smell however, but with these secondary respiratory functions. The currents of air which enter the nose pursue an upward curved course above and below the various turbinates. The great vascularity of the nasal mucous membrane and the secretion of the mucous glands in the membrane are prime factors in supplying heat and moisture to the inspired air. By the time the air has reached the larynx it is normally warmed to blood temperature and laden with moisture. The erectile tissue over the turbinates is active and undergoes engorgement whenever the environmental air is dry, in order to provide the necessary moisture. Cold air must be warmed, hence engorgement is necessary. Warm humid air causes least activity of the erectile tissue. It is well to remember that during twenty-four hours your nose normally excretes somewhere between a pint and two quarts of water into the air that you breathe.

The normal nose acts as a filter for dust and bacteria. The mucus that is periodically secreted by the lining membrane of the nose forms a mucous sheet which protects the nasal structures. This mucous sheet is constantly being wafted back to the nasopharynx by the action of the cilia of the nasal lining. Dust and bacteria that have filtered through the vibrissae are deposited on the mucous sheet, carried back into the nasopharynx, and swallowed. Phagocytic activity takes care of bacteria that penetrate the sheet. Sinuses in a state of health contain almost no secretion and are fairly free from bacteria. Recent work indicates that nasal secretion itself has considerable bactericidal property.

Normal nasal physiology is disturbed whenever the nose becomes obstructed so that air may not be freely inhaled and exhaled. Mouth breathing becomes necessary; the various physiological functions of the nose are lost. A transient episode of mouth breathing for a day or two, or for a week or two, does little harm, in adults or children. In the young child, unfortunately this may start the habit of breathing through the mouth. With persistence of this habit the sequelae with which we are all familiar develop; frequent head colds, sinus disease, deafness and ear diseases, dental deformities, speech disorders, lower respiratory tract complications. Following the establishment of the habit of mouth breathing, the upper dental arch is no longer held apart by the tongue. The splinting influence of the tongue upon the hard palate loses its effectiveness. The upper lip sags on the sides, the whole arch narrows, while the front teeth protrude. The lower jaw is out of touch with the upper jaw and malocclusion results. Unless corrected, this boney deformity persists through life and satisfactory nasal respiration is unlikely ever to be enjoyed.

Obstruction of the nasal airways may be acute and of short duration as in a simple cold, or it may be persistent. Chronic nasal obstruction has many causes. It may be due to a badly deviated septum. Mild septal deformity is most commonly due to abnormal growth; severe septal deformity is usually due to trauma. Again, enlargement of the turbinates may obstruct the airways as in chronic sinus disease, and chronic sinus disease in children often escapes attention. When this is of long duration, especially in an allergic type of individual, polypi often form. These can fill the entire nasal cavity and protrude from each end. Vasomotor rhinitis and other allergic conditions are common in the nose. The rhinologist recognizes and treats these and other disorders with satisfactory results both in children and in adults. In the majority of cases he can restore normal nasal physiology.

At times the anterior nares are the seat of nasal obstruction. Alar collapse, so-called, is more frequently seen in adults than in children. It is found in children with marked deformities of the hard palate. In the adult and in the child reeducation of breathing is necessary. After the cause is removed they must be taught to breathe less violently in order not to collapse the alae with each inspiration. Gradually normal alar function is restored. Congenital deformities of the anterior or posterior openings of the nose are infrequently met with. But they do occur and are fussy to deal with. In any case where there is marked difficulty in breathing through one or both sides of the nose the rhinologist is always on the watch for congenital malformations. Of course, tumors, benign and neoplastic, are also found occasionally, in both adults and children, to be the cause of nasal obstruction.

As you all know, the chief cause of nasal obstruction in children is hypertrophied adenoids. Such a child is addicted to mouth breathing, subject to frequent head colds, often having ear trouble, below normal as regards weight and size, developing an adenoidal facies:—with the removal of the adenoids all these symptoms are supposed to be alleviated. However, the rhinologist often finds that the removal of the adenoids alone does not cure his patient. When it does cure such a person the operation has been done early in life before the sequelae of boney and dental deformity have developed. I think that it is not fair, when adenoid removal has failed to cure mouth breathing, merely to dismiss the child and tell the parents that *they* must break the habit of mouth breathing. It is fair to do this *only* when all other causes of mouth breathing have been carefully ruled out.

It is the doctor's duty to recognize dental deformity and to insist that such children go to an orthodontist for advice. The orthodontist uses as his great assistant normal growth. Only in cases where marked deformity will result does he modify natural growth forces by means of the application of slight but persistent force in a desired direction. The orthodontist, in his correction of dental deformity, demands that his patient have a normally functioning airway. It does not avail him much to apply bands, secure good position, and then find that the child, because of obstruction to his nasal airways, persists in the habit of mouth breathing and undoes all that the orthodontist has corrected.

In my work at The Harvard Dental School these past few years I have noted that by modifying the position and shape of the upper dental arch the orthodontist at times produces effects in the nasal cavities. Deviated septums are not straightened and sinus disease is not cured by the orthodontist. But in certain types of cases the nasal airways are definitely widened. This was first proven by Dr. George Wright in 1911 when he devised an apparatus which enabled him to measure the width of the nasal cavity and keep track of any changes in the width of the nose as he widened the hard palate, which is also the floor of the nose. I quote from Dr. Wright, "All of these cases, thirty or more, show some nasal deformity conincident with a dental irregularity. They all show a change in the width of the superior maxillary bones measured between the antral walls below the turbinates, as recorded before and after regulation respectively. They all show improvement, some slightly and others in a marked degree in intranasal respiration after maxillary readjustment and in consequence enjoy a better nasal sanitation, ventilation, and drainage, better nasal respiration and greater freedom from head colds, The factor of restored facial symmetry must not be lost sight of, although personally I am most inclined to emphasize first, the importance of the normal function of the mouth and nose, believing that when this is secured all other beauty and harmony will inevitably follow."

The orthodontist then, by widening the nasal cavities, alleviates nasal obstruction in those cases with a mildly deviated septum in a very narrow nose situated above a high narrow hard palate.

What I have been trying to say up to now is that adenoids alone are not always responsible for nasal obstruction and that the rhinologist has competent means of treating nasal obstruction due to sundry causes. The co-operation of the allergist, internist, and orthodontist is necessary. And in conclusion I feel that in order to prevent dental deformities and other sequelae it is imperative that obstruction, acute or chronic, in one or both nasal airways, be recognized and treated as early in life as it occurs. Adenoids should always be removed in the first few years of life if they become obstructive. Allergic nasal conditions, deviated septa, chronic sinus disease likewise demand early treatment. When it has been thoroughly demonstrated that a mouth breather has adequate nasal airways and satisfactory dental occlusion, then, and then only, is it fair to spend time and energy in re-educating him in the art of breathing through his nose.

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IS IT RIGHT OR MIGHT?

Already the question of group health plans has become the subject for fruitless politico-legal squabbling. The opposition, consisting chiefly of organized medicine as at present constituted, raising the cry of unethical and impractical, punishes the participating doctors by discharge from the organization and by refusal of hospital facilities,—all this with hardly fair trial of the plan or of the participants. The supporters retaliate with cries of monopolistic practices and restraint of trade on the part of organized medicine. This gives our barrister brethren the opportunity to holloa their eloquence in trying to determine whether medical services can be considered as articles of trade or medical societies as monopolies and thereby subject to the laws governing said trade and monopolies. Whether or not the system would be advantageous enters little into the discussion. The nature of the controversy seems to signify nothing except that if my big brother can lick your big brother, my views will rule whether or not they are useless. Perhaps if those big fighting brothers went to Europe they could serve to advantage.

HOSPITAL ANESTHETIST

One of our patients has recently returned from a hospital in a neighboring state, to which he had gone to have a hernia repaired. As the surgeon had formed no opinion as to the relative value and safety of the different anesthetics, the patient was asked to choose the anesthetic which he preferred. He was flattered by this evidence of confidence in his own judgment and approved the hospital which had available a number of different anesthetics and which allowed him to choose the one best fitted to his particular case. As he did not care to remain conscious and witness his own operation he favored general anesthesia rather than a spinal or local anesthetic. From the list of general asthetics he chose ether as the least experimental and best tested agent. The ether was administered by a nurse, without apparent supervision. As the patient recovered without complications we must conclude that the anesthesia was well done. On leaving the hospital the patient paid a bill of ten dollars for anesthesia, which seemed a reasonable charge. Of the ten dollars, thirty cents went toward the nurse's salary, leaving a considerable profit for the hospital. So everyone was satisfied.

But the outcome for the patient is not always so fortunate. While anesthetic fatalities are rarely reported, study of the daily papers, of vital statistics and of medico-legal reports indicate that fatalities do occur as the result of incompetent anesthesia. In the recent edition of Crossen's "Operative Gynecology," we find "For example, it is evident to any experienced observer that the administration of ether, today, in general, falls far short of the skill and efficiency of former years, both in safety to the patient and in comfort to her."

For many years, because of lack of time in the four-year course, medical schools have neglected to provide any instruction in the theory and practice of anesthesia. Hospitals and clinics have entrusted the administration of anesthetics to nurses, stenographers and other technicians as the most economical and least bothersome arrangement. In apology it was claimed that the surgeon could supervise the anesthesia. But it soon happened that the surgeon was entirely ignorant of the work which he was required to supervise. As an intern he had completed his hospital term and entered practice without theoretical instruction and without ever having given a single anesthetic.

In Rhode Island, during the same period of time, none of the graduates of our leading hospitals have been thrust out on the community without considerable practical training in anesthesia. Realizing that nurses administer anesthetics well and that nurse anesthesia is to the economic advantage of the hospitals, the argument which has persuaded hospital management to continue the anesthetic training of interns is that this training is essential for the best work of the surgeon himself. However perfect his surgical technique may be, without knowledge and experience in anesthesia he is not perfectly fitted to carry on surgical work. The majority of the physicians of Rhode Island are competent anesthetists. Most of the surgeons have the advantage of training and practical experience with anesthetics.

With the advent of group hospitalization, the question of the conduct of anesthesia comes up for discussion. In Rhode Island we must not follow the example of less fortunate communities where the welfare of patients, present and future, has long been sacrificed to the present economic benefit of the hospitals. If "the relation of the physicians of the hospitals of Rhode Island to the insurance system be properly and adequately coordinated," as provided in Dr. Gerber's motion, adopted by the House of Delegates of the State Society at the September meeting, our anesthetic situation may be maintained in its present comparatively satisfactory condition.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

The next examinations (written and review of case histories) for Group B candidates will be held in various cities of the United States and Canada on Saturday, November 5, 1938, at 2:00 P. M., and on Saturday, February 4, 1939. Application for admission to the written examination scheduled for February 4, 1939, must be filed on an official application form in the office of the Secretary at least sixty days prior to this date (or before December 4, 1938). The general oral, clinical and pathological examinations for all candidates (Groups A and B) will be conducted by the entire Board, meeting in St. Louis, Mo., immediately prior to the annual meeting of the American Medical Association in June, 1939. Application for admission to Group A examinations must be on file in the Secretary's office before April 1, 1939. For further information and application blanks, address Dr. Paul Titus, Secretary, 1015 Highland Bldg., Pittsburgh (6) Pa.

RHODE ISLAND MEDICAL SOCIETY

Meeting of the Council

A stated meeting of the Council of the Rhode Island Medical Society was held at the Medical Library, Thursday, September 15, 1938. Present:—Drs. Holt, Mowry, Rocheleau, Gauthier, Wheaton, A. T. Jones, Partridge, Miller. The meeting was called to order at 4:00 P. M. by the First Vice-president, Dr. Charles H. Holt. In the absence of the Secretary, Dr. Albert H. Miller was appointed Secretary *pro-tem.*

The minutes of the last meeting of the Council were read and approved. On motion by Dr. Mowry, the action of the First Vice-president in appointing Dr. Roland Hammond as delegate to the special meeting of the House of Delegates of the American Medical Association was approved. On motion of Dr. Mowry, it was voted to recommend to the House of Delegates that Dr. Charles Bradley be appointed Chairman of the Committee on Exhibits to fill the term of the late Dr. Skelton. Dr. Holt suggested that the Medical Library Building be open on certain evenings. It was voted to refer this matter to an open meeting of the Society.

The meeting was adjourned at 4:25 P. M.

Respectfully submitted,

ALBERT H. MILLER, M.D.,
Secretary pro-tem.

Meeting of the House of Delegates

A stated meeting of the House of Delegates of the Rhode Island Medical Society was held at the Medical Library on Thursday, September 15, 1938. Present:—Drs. Holt, Mowry, Rocheleau, Gauthier, Wheaton, Partridge, Miller, Beardsley, Muncy, Meyer Saklad, Gormly, Collom, Hayward, Henry, Dimmitt, Eddy, G. Raymond Fox. The meeting was called to order by the First Vice-president, Dr. Charles H. Holt, at 4:50 P. M. In the absence of the Secretary, Dr. Albert H. Miller was appointed Secretary pro-tem.

The minutes of the last meeting of the House of Delegates was read and approved. The minutes of the Council were read and approved. The appointment of Dr. Roland Hammond as Delegate to the special meeting of the House of Delegates of the American Medical Association was approved. On motion of Dr. Dimmitt, the appointment of Dr. Charles Bradley as Chairman of the Committee on Exhibits was approved.

The following motion, introduced by Dr. I. Gerber and referred from the June meeting of the Society, was read by the Secretary pro-tem:—

"Dr. Gerber moves that the House of Delegates be instructed to study in detail the matter of starting a system of Group Hospitalization Insurance in this state; that it be empowered to confer with the already existing committee of superintendents and trustees of the various Rhode Island hospitals now considering the establishment of such insurance; that it take steps to see that the relations of the physicians of the state of Rhode Island to the insurance system be properly and adequately coordinated; and finally that the results of such study and conference be transmitted to the members of the Rhode Island Medical Society before the end of this calendar year, either by a special meeting or by appropriate reference to the various constituent county societies."

On motion of Dr. Saklad, Dr. Gerber's motion was approved by the House of Delegates and the President was instructed to appoint a committee of as many members as he sees fit, to carry out the provisions of the motion.

The following resolution, presented by Dr. George W. Waterman and referred from the June meeting of the Society, was read by the Secretary pro-tem:—

"Whereas it has been brought to our attention by the Cancer Committee of the Rhode Island Medical Society that certain resolutions were passed by the Conference of State and Territorial Health Officers with Surgeon General Parran on April 11th, 1938, having to do with the cancer problem; and

"Whereas in these resolutions recommendations were made calling for the passage of a State Cancer Law for each State, establishing within the Department of Health a division of Cancer Control; the function of this division to include training of physicians in the early diagnosis and treatment of cancer; the dissemination of knowledge to the Public concerning necessity for early diagnosis and treatment; and the promotion with the co-operation of the medical profession of the establishment of adequate cancer clinics, treatment centers and free diagnostic service; and the recommendation that State aid for the treatment of cancer be provided and

"Whereas we believe that in the State of Rhode Island the field of cancer control is now in process of being satisfactorily covered by already existing or proposed diagnostic and treatment centers; likewise the field of professional education has been satisfactorily handled through the Rhode Island Medical Society including its Cancer Committee; and the field of lay education is being well developed under the guidance of the Rhode Island Unit of the Women's Field Army of the American Society for the Control of Cancer; therefore

"Be it Resolved that the Rhode Island Medical Society declares itself as opposed to the above resolutions advanced at the Conference of the State and Territorial Health Officers; that it feels that the campaign against cancer is now being handled properly in the State of Rhode Island, both from the point of view of actual medical attack as well as professional and lay education; that it further believes that the promulgation of the ideas advanced at the above conference can only lead to unnecessary duplication of work with consequent waste of time, money and effort; and that it further instructs its delegate to the annual meeting of the American Medical Association to present the sentiment of this resolution to the National House of Delegates for their consideration and possible action."

On motion of Dr. Partridge, this resolution was adopted by the House of Delegates.

The meeting was adjourned at 5:50 P. M.

Respectfully submitted,

ALBERT H. MILLER, M.D.,
Secretary pro-tem.

PROVIDENCE MEDICAL ASSOCIATION

Minutes of the June Meeting

The regular monthly meeting of the Providence Medical Association was called to order by the President, Dr. Alex. M. Burgess, on Monday, June 6, 1938, at 8:40 P. M.

The minutes of the last meeting were read and approved. The Secretary read a communication from Dr. Wells, Secretary of the Rhode Island Medical Society, regarding a medical survey of the Providence District to be carried out in accordance with a plan prepared by the American Medical Association. After explanatory remarks by the President and on motion by Dr. Chafee, it was voted that the President appoint a committee to carry out such a survey.

Their applications having been approved by the Standing Committee, the following were elected to

membership: Benedict Chapas, Edward V. Heffernan, Thomas A. Martin, Gordon E. Menzies, Kenneth T. Moore, Robert Penington, Francis E. Temple, Robert J. Williams.

The Secretary reported for the Standing Committee that at its last meeting this Committee voted to recommend to the Association that the President appoint a committee to study and report on the matter of group hospitalization. It was voted that the President appoint a committee of four to study this subject and report to the Association. The President announced the following appointments to this committee: Doctors Henry S. Joyce, Chairman, Elihu S. Wing, Eric P. Stone, and J. E. Greenstein.

The Secretary reported for the Standing Committee that at its last meeting this Committee voted to recommend to the Association that the President be requested to appoint a committee to study and report on proper methods of furthering the work of examination for tuberculosis amongst food handlers, nurse-maids, industrial workers. It was voted that the President appoint a committee of five to carry out this work. The President announced the appointment of the following committee: Dr. Philip Batchelder, Chairman, Drs. U. E. Zambarano, William P. Buffum, Joseph Smith, and Francis H. Chafee.

Dr. William S. Streker reported for a subcommittee of the Standing Committee on the employment of an executive secretary. Dr. Streker reviewed the events leading up to the fulfillment and completion of this project and introduced Mr. John E. Farrell, the new executive secretary, who made a few remarks to the Association.

An obituary of Dr. Charles H. Leonard was read by Dr. Peter Pineo Chase and an obituary of Dr. Louis Chapman was read by Dr. Charles E. Hawkes. It was voted to spread copies of these obituaries on the records of the Association and to send copies to the families and to the RHODE ISLAND MEDICAL JOURNAL.

Dr. Louis Goodman, Pathologist at the State Hospital, presented a specimen of pseudo myxoma peritonei.

First paper of the evening was by Drs. William P. Buffum and Stanley S. Freedman, and was entitled "The Diagnosis and Treatment of Household Dust Sensitivity in Bronchial Asthma of Children." The second paper of the evening was read by Dr. Henry N. Pratt, Assistant Physician to the Children's Hospital of Boston, and was entitled "Seasonal Aspects of Asthma and Hay Fever with Special Reference to a Recent Study of Molds." The papers were discussed by Drs. Bates, Chafee, Ham, and Riley.

The meeting adjourned at 10:55 P. M. Attendance, 92. Collation was served.

Respectfully submitted,
HERMAN A. LAWSON, M.D., *Secretary*

Rhode Island Hospital

THE HURRICANE

From a Nurse's Diary

Wednesday, September 21

Not one of us dreamed, when greeted by more rain this morning, that our complaints about the wet weather were soon to be completely stilled in awe of nature's savagery. To begin the day our feathers were damp and our spirits ruffled by a crowded "board." The students were relatively new, everyone tried to work at once, and noon found us still going strong. Piles of gloves, unfinished cases, an encephelogram to be done, and outside the storm had continued increasing after a futile bright moment about noon.

"It's going to be a bad storm"—"things are blowing around"—"awful windy out"—these fragments of conversation drifted in as we hurried to catch up with the fleeting moments. By 3 o'clock the wind was blowing in earnest, the trees were bent low by its fury, loose articles were snatched and hurled through the air. The dirt drifted through closed windows under the force of the wind.

"Good day to go up in the tower," we joked.

Soon we noticed gray, black objects flying by. "Imagine they are birds or pieces of paper."—"No; shingles!" someone said, looking at the roof above the staff room. "It can't be!"—(Well, it was.) Who would think that the roof over the staff room would lose its shingles? "Afraid the doctors' suits will be damp if the roof comes off." We laughed, for it seemed absurd. Too little did we realize how soon this absurdity would be reality. The heavy slate shingles were wrenched off and appeared to be birds flying away, so swift was their course.

While we were mending a mountain of gloves, and watching our departing shingles, the 3:30 people joined us. (Those who had been out were literally blown back.) The "boss" was preparing to go off for the remainder of her afternoon. (She'd forgotten it was her P. M. and had returned.) Then the fury of the gale broke and altered everyone's plans; the "boss" forgot there was any such thing as an afternoon, and were we glad many times over that she had accidentally come back, for a crash heralded the triumphant invasion of rain and wind.

The rending of glass sent us out of the supply room to find the skylight smashed in above the dental room door—wind tearing furiously at the roof—

shortly after, the hatch gave way leaving an opening to the sky—rain and wind pouring in—large sheets of corrugated iron flipping back over the etherizing room windows as they were wrenched off of the roof.

Paging Mr. Fowler! Paging Dr. Rice! News that a cable in the yard was down injuring three men. Trees down outside the J. B. M. Branches tearing off of our trees as we watched them.

Dr. Rice and Mr. Fowler up inspecting the wreckage,—the swaying towers, the falling trees. Calling the fire department for aid. Calls that couldn't go through. The telephone lines were down.

"Sweep up that trash," Dr. Rice said of the shattered skylight. (The "boss's" reply we fear is lost to posterity. It was something about getting out from underneath ere the remaining glass fell and fractured his skull.) The trash was swept up—while more tumbled down. During the wild, straining, roaring of the wind, we held our breath—waiting for, dreading the next crash that would precede the shattering of glass.

By this time everyone forgot about going off duty. The gloves were finished as the skylight above the new elevator started to rain down. We carried our gas tanks to safer quarters just before the remaining glass poured in, during a furious burst of wind.

The ambulance bells rang wildly. Accident cases began coming in. The stairway and elevator at the south end were too dangerous to use. Meanwhile doctors were at a premium, telephone wires were dead, visiting men could not be reached, house officers of all services turned to the task of repairing torn, bruised, bleeding humanity.

Two patients in almost every room for we dared not use Room 1; that skylight had started to go. The windows and skylights of the rest of the rooms in which the doctors worked were threatened every minute by the tearing winds and the debris flung about by the gale. Dr. Bowen, who finally got in despite the storm, was forced to dash from the staff room while in the process of dressing, dodging flying glass as the windows gave way. We tried to close the fire doors against the storm. With the wind, glass and rain pouring in, holding onto the edge above the floor, we wedged the doors closed with sandbags, trees and arm boards.

The crescendo of the storm waxed furiously. It hardly seemed that the wind could blow harder—but it did. Room 1's window was in, the skylight broken in two places. The sterile goods had to be moved out. We would need them, heaven knows! As we gathered our breath to dash in before the next roaring attack of wind, the boys were ahead of us. Tom, Henry, Carl, Ray—moving out the big lights, the cans, dodging flying glass to save our needed equipment.

In the midst of this the "boss" was gone—gone to the supply closet to bring down extra supplies. Supplies for the "train wreck" which we had long laughed about, now to be sterilized for a more serious menace, a wide-spread disaster. She had gone to the most dangerous part of our shivering, swaying, crippled operating room. But she and the supplies, with Dr. Bell's and Carl's assistance, arrived back safely. Our main corridor from the doors up was lined with gas tanks, supplies from Room 1, goods to be done up, sterile goods. The autoclaves were going full tilt.

Then the dreaded sterilizing room and scrub room windows gave way beneath the pelting of slate which slashed through the screens; and with the glass flying in, we covered the sterile goods with rubber sheets and aprons. The autoclaves went in, the sterilizers were filled and emptied. Even the oil sterilizer had to be used (you stood as close to the sink as possible) and while the cover was up you wondered for a brief second what might fly in. No one had much time though to worry about the glass which was being flung in and no one will know why it hit none of us, nor why the slate, which smashed through the supply room screens, did not break these windows in upon us as we did up the supplies of sheets and towels.

Many people came up to help us, threaded sutures, made supplies; unexciting tasks perhaps, but oh so important, and as dangerous as any with the treacherous windows apt to blow in. Everyone of the rest was busy running, cleaning up, setting up and trying to keep everyone supplied. Heaven will be a place where operating room nurses have roller skates with floating power, three extra hands (an always sterile forceps in one)—it will have a cornerstone to the "gang" who belonged and one to the "gang" who assisted during the "blow."

The bravery of the patients was astounding, little or no anaesthesia was used for the most part. Perhaps the stunning fury of the storm had dimmed the pain. The fright of what the next blast might bring may have caused patients to forget their battered, painful, broken bodies. Due to a shortage of beds we had an improvised ward in our recovery room until an annex was opened in Dr. Peter's old apartment.

The night people, hearing of our excitement, had come on early and eagerly set to work. Sometime late in the evening we dashed down to the dining room for a bit of supper. The sight that greeted us from the dining room window was frightening, staggering; the grounds had become a jungle of torn, twisted trees, tossed into a heap by the storm.

More accidents, injuries and even abdominal emergencies, for appendices are not respectors of hurricanes; and they were removed amid the howls of the storm.

Sometime late that evening, as some semblance of order returned, those who could went off duty to rest, if rest they could, with the ever increasing tales of horror and suffering which drifted in—the fear of even greater disaster should the storm increase its attack on our weakened damaged buildings. The clocks had stopped at 4:20 P. M., with the

interruption of the A. C. current, and our time from then on was marked by the attacks of the wind.

All night long a steady stream of work poured in, and after midnight the night people carried a terrific load of disasters, lightened though, by the cheerful, cooperative acceptance by the doctors, of the limited facilities.

Thursday, September 22

Dawn came late; a pale, gray gaunt ghost, with the wind blowing hard in a tired fashion as if loathe to stop its cruel torture.

Shortly after 7 A. M. we faced our bedraggled battered operating room and taking stock of its injuries, set about the repair work. Armed with brooms, mops, dust pans, brushes, we swept up cans of roof and glass. Supplies were put back in their places. The crew of workmen covered the gaping windows with tar paper, then started repairs on the torn roofs and skylights.

The destruction inside was great, but replacement was not too difficult to achieve. But what of the repairs and replacements which cannot be made —to those mutilated, uprooted or dying trees we have been able to look out upon. Like lifeless giants they now lie, some across cars they battered beneath them. The foliage of the trees which withstood the gale is curled, withered, and dying, as if overwhelmed by abject misery at the sight which surrounds them. There was no humor, no compassion in the wind which drove heavy slate shingles inches deep into the ground and flung them blocks away.

"Emergency operations only" was the order of the day. Believe it or not some tonsil children came in.

Our autoclaves did double duty. We fortunately had our own power and could sterilize for the hospital where facilities were completely crippled.

There was a returning sense of time and a growing anxiety for friends and relatives. Reports slowly drifted in of the extent of the hurricane and tidal wave; reports by word of mouth or distant radio stations, for there was no local power or telephone communications.

Our gas plate worked (we had to make clips for the six dozen gloves we did up in a hurry last night) but a gas shortage was reported, due to a fire in the gas plant. A two-page *Journal* printed on the presses of the *Woonsocket Call* was eagerly read when Dr. Messinger came up with it.

Accident cases continued to come in through the day. All efforts now are bent upon repair and it will be a job fraught with hazards and danger.

Crawford Allen had to be moved up today. Our friend who breaks his cast every time he has to go to the Allen will no longer have to worry.

Friday, September 23

Working now on a more normal schedule. Men still getting up and down into the towers and tiptoeing through the plaster and dental rooms. They get lost trying to find the door to the attic every once in a while. Brave as these men are at their job atop the roof, they quail at the sight of our operations and hold their noses at the smell of ether.

The tar paper over the "inner sanctum" of the nurses' room is the subject of some discussion. Do you suppose they will decide to put that skylight in at "the wrong time"?

Anxiety and fatigue have worn dispositions thin and we are beginning to realize we have been tired for two days. Every bang and crash seems unfinished when no glass breaks. Nerves are taut with waiting for news, news which does not come due to crippled communications. Our mail is very easily distributed now—there is so little.

Saturday, September 24

Everything is much brighter. The sun shines shamelessly upon the stripped wreckage outside. Messages and letters are coming through. Telegrams to the outside are much delayed.

Oh the irony of remarks by those who missed its fury (though we are glad they did)—"How did you like the hurricane?"—this at the end of a six-page letter from Maine today. It probably sums up their knowledge of what happened.

Sunday, September 25

The clocks are going again. Some day when we tell our grandchildren (optimists) "the glass flew about us, and it was a terrible hurricane" they will probably think us a little tiresome. They will not know that even Hitler and the European War Crisis was forced out of the headlines for a time by the Hurricane News.

On July 1st Dr. Gerard Archambault of West Warwick started a dental internship of fifteen months—twelve months dental and three months in anesthesia. Dr. Archambault attended Providence College and Harvard Dental School.

August 1st, Dr. William W. Teahan, who had interned at the Rhode Island Hospital during the past two years, became Assistant Superintendent of the Hospital.

July 1st, Dr. Vincent Zecchino of Flushing, Long Island, started a residency on the orthopedic and fracture service. Previous to coming here, Dr. Zecchino spent eight years in a military school in Conversanem, Italy, and one and a half years as intern on the orthopedic service at the Long Island College Hospital. Dr. Zecchino graduated in medicine from the University of Bologna, Italy.

September 15th, Dr. David Jennison of Providence started a two years' internship. Dr. Jennison is a graduate of the University of Maine and Harvard Medical School.

July 15th, Dr. John A. Dillon of Waterbury, Connecticut, began a two years' internship. Dr. Dillon is a graduate of Holy Cross College and Yale Medical School.

June 15th, Dr. Wilfred I. Carney of Youngstown, Ohio, started a two year's internship. Dr. Carney is a graduate of Latrobe College and Jefferson Medical School.